CLAIMS

1. An infrared imaging device comprising:

a display device, and,

a camera, said camera comprising:

an aperture arranged to allow radiation to enter said camera;

a first sensor having a first output, said first output representing an image of said radiation passing through said aperture filtered into a first spectral range;

a second sensor having a second output, said second output representing an image of said radiation passing through said aperture filtered into a second spectral range; and,

a beam splitter arranged to receive radiation passed through said aperture, said beam splitter having a first waveband filter arranged to pass radiation in at least a portion of said first spectral range to said first sensor, and a second waveband filter arranged to pass radiation in at least a portion of said second spectral range to said second sensor;

wherein said camera and said display device are aligned along a common optical axis such that parallax between said first and second sensors, and parallax between said camera and said display device are eliminated, said display device in communication with said camera and arranged such that said first output, said second output, and a combination of both said first and second outputs may be viewed selectively or jointly.

2. An infrared imaging device according to claim 1, wherein said camera further comprises a common objective lens between said aperture and said beam splitter, said objective lens arranged to allow radiation in at least a portion of said first spectral range and at least a portion of said second spectral range to pass therethrough.

3. An infrared imaging device according to claim 2, wherein said common objective lens comprises a composite lens of elements ZnSe - $Ge_{33}As_{12}Se_{55}$ – ZnSe, said objective lens arranged to correct aberrations in said first and second spectral ranges.

4. An infrared imaging device according to claim 1, wherein said camera further comprises:

a first objective lens between said beam splitter and said first sensor, said first objective lens capable of allowing radiation in at least a portion of said first spectral range to pass therethrough; and,

a second objective lens between said beam splitter and said second sensor, said second objective lens capable of allowing radiation in at least a portion of said second spectral range to pass therethrough.

5. An infrared imaging device according to claim 1, wherein said camera further comprises:

a common reflective objective lens comprising a first concave mirror arranged to reflect radiation entering said aperture; and,

a reflective surface arranged to redirect said radiation reflected off said common reflective objective lens toward said beam splitter.

6. An infrared imaging device according to claim 1, wherein:

said first output comprises a first optical image;

said second output comprises a second optical image;

said camera further comprises a beam combiner arranged to optically combine said first and second outputs into a third output; and,

said infrared imaging device further comprises an optical viewer arranged to provide said first output, said second output, or said third output.

7. An infrared imaging device according to claim 6, wherein said optical viewer is monocular.

8. An infrared imaging device according to claim 6, wherein said optical viewer is binocular.

9. An infrared imaging device according to claim 6, wherein said infrared imaging device is mountable to a headgear such that said optical viewer aligns with the eye of an operator.

10. An infrared imaging device according to claim 9, wherein said optical viewer is repositionable away from the eye of said operator.

11. An infrared imaging device according to claim 1, further comprising at least one lens arranged between said beam splitter and said first sensor arranged to correct aberrations within said first spectral range, or between said beam splitter and said

second sensor arranged to correct aberrations within said second spectral range.

12. An infrared imaging device according to claim 1, wherein:

said first sensor comprises electronic and optical outputs representing said radiation filtered into said first spectral range;

said second sensor comprises electronic and optical outputs representing said radiation filtered into said second spectral range;

a first processor arranged to combine together said electronic outputs from said first and second sensors; and,

a beam combiner arranged to optically combine together said optical outputs from said first and second sensors are optically.

13. An infrared imaging device according to claim 12, wherein said first processor combines together said electronic outputs at the same time as the beam combiner combines said optical outputs.

14. An infrared imaging device according to claim 1, further comprising an interconnect assembly, said interconnect assembly comprising:

a first connector arranged to releasably secure said infrared imaging device to a headgear such that the bottom of said display device is just above the eyes of an operator when said headgear is worn;

a second connector arranged to releasably secure a power assembly to said headgear; said power assembly arranged to serve as a balancing weight; and,

at least one interconnecting cable coupling said power assembly to said sensor assembly.

15. An infrared imaging device according to claim 1, wherein said display device comprises a viewing device mountable to a headgear such that, when said headgear is worn by an operator, said viewing device is positioned just above the eyes of an operator, and said viewing device may be viewed by said operator by looking upwards towards said viewing device.

16. An infrared imaging device according to claim 1, wherein said display device is capable of selectively displaying said first output, said second output, or a fused image from said first and second outputs, wherein said fused image comprises at least a portion of said first output with at least a portion of said second output.

17. An infrared imaging device according to claim 16, wherein said fused image comprises a picture in picture or side-by-side configuration.

18. An infrared imaging device according to claim 16, wherein said fused image comprises said first and second outputs combined to form an overlapped image.

19. An infrared imaging device according to claim 1, wherein said display device is capable of selectively displaying said first and second outputs independently such that said first output is viewed on one portion of said viewing device, and said second output is displayed on a second portion of said viewing device.

20. An infrared imaging device according to claim 1, wherein said first output is viewable in a first eye on an operator, and said second output is viewable in a second eye of said operator.

21. An infrared imaging device according to claim 1, wherein said camera further comprises an optical window over said aperture.

22. An infrared imaging device according to claim 21, wherein said optical window is constructed of materials selected from the group consisting of hot pressed ZnS, Ge, Si, and ZnSe.

23. An infrared imaging device according to claim 1, wherein said first sensor comprises a VIS/NIR sensor aid second sensor comprises a LWIR.

24. An infrared imaging device according to claim 1, wherein said infrared optical device is substantially inaudible.

25. An infrared imaging device according to claim 1, further comprising two viewing windows, each of said viewing windows arranged such that the distance between said two viewing windows is adjustable.

26. An infrared imaging device according to claim 25, further comprising a magnification lens arranged in the front of each viewing window to enlarge an image thereon.

27. An infrared imaging device according to claim 1, further comprising a transmitter arranged to transmit the output of said camera to a remote location.

28. An infrared imaging device according to claim 1, further comprising a laser illuminator mounted to said camera for NIR illumination.

29. An infrared imaging device according to claim 1, further comprising:

a waterproof and fireproof envelope sealing said camera and said display device; and,

at least one foam cut inserted between said envelope and said camera, said at least one foam cut arranged to protect said infrared imaging device against vibration, impact, and hot/cold weather.

30. An infrared imaging device according to claim 1, further comprising a voice activated switch arranged to selectively control said infrared imaging device.

31. An infrared imaging device according to claim 1, further comprising processing circuitry arranged to implement image processing and automatic target recognition.

32. An infrared imaging device according to claim 1, further comprising a switch arranged to alternatively display said first and second outputs.

33. An infrared imaging device according to claim 1, wherein said first and second sensors each comprise identical optics and said first and second outputs are arranged such that when a user opens the left eye while holding the right eye closed, the first output may be seen, when said user opens the right eye while holding the left eye closed, the second output may be seen, and when both the left and right eyes are open, said use may see both said first and second outputs overlapped.

34. An infrared imaging device comprising:

an aperture arranged to allow entry of radiation;

a near infrared sensor having a first output, said first output representing an image of said radiation passing through said aperture filtered into the visible and near infrared spectral ranges;

a long wave infrared sensor having a second output, said second output representing an image of said radiation passing through said aperture filtered into the long wave infrared spectral range;

a beam splitter arranged to receive said radiation passed through said aperture, said beam splitter having a first waveband filter arranged to pass visible and near infrared radiation to said near infrared sensor, and a second waveband filter arranged to pass long wave infrared radiation to said long wave infrared sensor;

a beam combiner arranged to optically combine said first and second outputs into a fused image; and,

an optical viewer arranged such that said first output, said second output, and said fused image may be viewed selectively.

40. An infrared imaging device comprising:

an aperture arranged to allow entry of radiation;

a near infrared sensor having a first electrical output and a first optical output, said first electrical and optical outputs each representing an image of said radiation passing through said aperture filtered into the visible and near infrared spectral range;

a long wave infrared sensor having a second electrical output and a second optical output, said second electrical and optical outputs each representing an image of said radiation passing through said aperture filtered into the long wave infrared spectral range;

a beam splitter arranged to receive said radiation passed through said aperture, said beam splitter having a first waveband filter arranged to pass visible and near infrared radiation to said near infrared sensor, and a second waveband filter arranged to pass long wave infrared radiation to said long wave infrared sensor;

a beam combiner arranged to optically combine said first and second optical outputs into an optically fused image;

an optical viewer arranged such that said first optical output, said second optical output, and said optically fused image may be viewed selectively, said optical viewer adjustable from a first position aligned with the eyes of an operator wearing said headgear, and a second position out of alignment with the eyes of said operator; and,

a display device aligned along a common optical axis with said aperture and arranged such that said first electrical output, said second electrical output, and a combination of both said first and second electrical outputs may be viewed selectively, said display device comprising a viewing device mountable to a headgear such that, when said headgear is worn by said operator, said viewing device is positioned just above the eyes of an operator, and said viewing device may be viewed by said operator by looking upwards towards said viewing device.